

IME SUPPLEMENT | DEC 2023/JAN 2024

EUROTIMES

*Demystifying Common
Misunderstanding with
Refractive IOL Procedures*

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2022 ESCRS Clinical Survey Highlights: Trends in Presbyopia Correction

BY RUDY NUIJTS, MD, PHD, MAASTRICHT, THE NETHERLANDS

Results from the 8th ESCRS Clinical Trends Survey indicate that more practitioners are implanting presbyopia-correcting IOLs these days than at any other point, with a 4% rise since 2016. The use of these lenses in cataract surgery grew from 7 to 11%, which is a good increase over the years.^{1,2}

More practitioners are implanting presbyopia-correcting IOLs these days than at any other point, with a 4% rise in the use of these lenses since 2016.

—Rudy Nuijts, MD, PhD

The survey, which was conducted in conjunction with the 40th ESCRS Annual Congress in Milan, included 146 questions and drew responses from 1715 delegates.

It revealed that an increasing number of practitioners are implanting these lenses that can not only enhance distance vision but also potentially offer better near and intermediate vision in appropriate patients.

Still, some surgeons remain cautious about using premium lenses. The survey indicated that concerns continue to arise around implanting presbyopia-correcting IOLs, with 69% citing the cost to the patient as a worry, 57% concerned over nighttime quality of vision, and 42% troubled over loss of contrast and visual acuity decline.

Refractive IOL Trends

The type of presbyopia-correcting IOL technology used by the majority of practitioners in patients with presbyopia has also changed over the past 7 years according to the ESCRS Clinical Trends Survey. The survey revealed that the use of trifocal lenses has remained stable over the years at around 40 to 50%. Meanwhile, the use of Extended Depth of Focus (EDOF) lenses has doubled since 2016, while the selection of

some premium lenses has gone down. The use of bifocals has actually decreased to a figure of 2% (Figure 1).^{1,2}

Another aspect that the survey asked about was how many degrees of postoperative rotational error were considered acceptable after implanting a toric IOL before this significantly impacts visual acuity. Twenty percent of practitioners believe that between 6 to 10 degrees are acceptable. Another five percent even think that more than 10 degrees of rotational error is needed before it impacts vision. Altogether, one-quarter of respondents felt that it was acceptable to have more than five degrees of rotational error in these cases.

Overall, the trends here indicate that usage of presbyopia-correcting lenses is becoming more popular, with an increasing number of practitioners now relying on them to potentially enhance vision at a range of distances. A greater number of surgeons are beginning to implant EDOF lenses, while they also continue to use trifocal lenses at a pretty constant rate.

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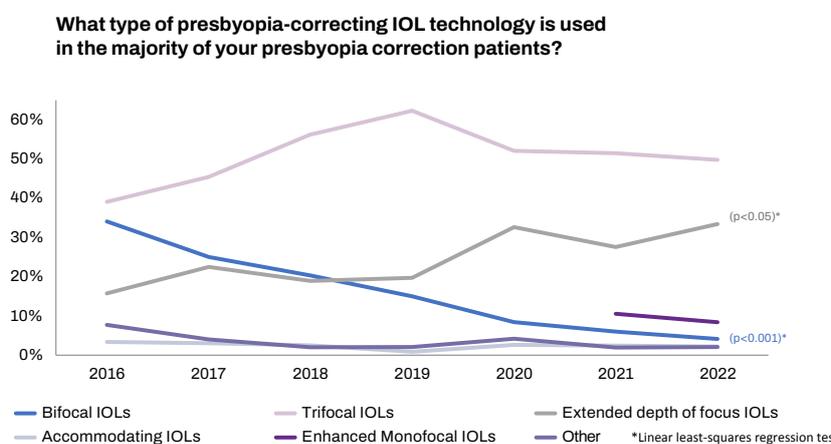


FIGURE 1: ESCRS Clinical Trends Survey reveals trends in delegate use of presbyopia-correcting IOLs over the past seven years.

Myth #1: Monofocal-Plus: The New Standard?

BY OLIVER FINDL, MD, PHD, VIENNA, AUSTRIA

A question that many refractive surgeons today contend with is whether a monofocal-plus lens with enhanced intermediate vision should be the new standard selection for cataract surgery instead of the traditional monofocal lens.

Live survey results from the 2023 ESCRS Congress in Vienna, indicate that 65% of respondents asked about this agreed that the monofocal-plus lens should be the first choice, while 35% disagreed.

There are many reasons to believe that the monofocal-plus lens should be the new standard.

—Oliver Findl, MD, PhD

Enhanced Monofocal Lens Technology

Traditionally, practitioners have relied on the standard monofocal lens, which corrects only for distance, as the go-to for the majority of cataract cases, making them the most commonly implanted type of IOL. The advantage of these is that they are relatively low-cost and offer high-quality distance vision, typically with few if any significant aberrations at night like dysphotopsia.

Enhanced lenses, such as a monofocal-plus lens, have tweaked asphericity on the anterior surface that enables them to improve intermediate vision as well, thanks to the extended-depth-of-focus. In addition to improvements in intermediate vision, these show no significant differences in terms of nighttime aberrations compared with monofocal IOLs.

The 2022 ESCRS Clinical Trends Survey indicated that in cases where a monofocal-plus patient had no residual refractive error and a healthy ocular surface, respondents believed that just 3.2% would experience clinically significant night aberrations (Figure 2).^{1,2}

If an enhanced monofocal presbyopia-correcting IOL patient has no residual refractive error and a healthy ocular surface, what do you believe will be the chances of them having functionally significant visual aberrations at night?

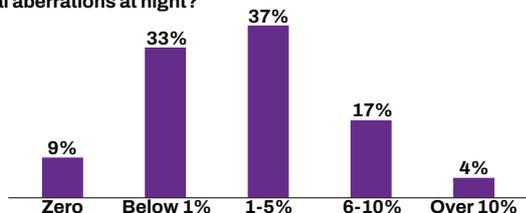


FIGURE 2: On average, respondents to the 2022 ESCRS Clinical Trends Survey believed that 3.2% of patients with an enhanced monofocal presbyopia-correcting IOL have functionally significant visual aberrations at night.

With the monofocal-plus lenses, there is a progressive power, which means the power changes continuously from the cen-

ter to the periphery of the lens. This provides a unique anterior surface power profile. While there is a “hot zone” in the center, this is not a ring with one add, but rather the power is fluid here (Figure 3).³⁻⁶ This enables the monofocal-plus lenses to provide significantly improved intermediate vision with minimal photopic phenomena such as halos, glare and starbursts that can plague those with traditional bifocal or trifocal lenses.

Using the monofocal-plus lens may also have advantages for distance vision in that it might be more forgiving if the power is slightly off. With a larger landing zone for biometry and refractive outcome, it allows a higher tolerance for the margin of error. Given the curve of the lens is flatter, there’s a higher chance that the patient has a good uncorrected distance acuity and does not need glasses for distance vision.

For those practitioners who have avoided using presbyopia-correcting IOLs over concerns about receiving patient complaints about halos and night vision problems, the monofocal-plus lens may also be a good option to recommend to patients.

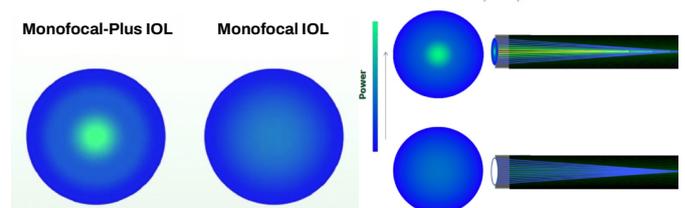


FIGURE 3: In a monofocal-plus lens the power changes continuously from the center to the periphery of the lens.

Priority Patient Selection

To succeed with the monofocal-plus lens, it means keeping the patient’s needs in mind and selecting those in particular who are seeking good distance vision. Ideally, they’re active and dynamic; they have activities with intermediate vision needs, and they desire some degree of spectacle independence.

You may even want to take into account the patient’s own physique, with characteristics that may enable them to fare better with a modest amount of intermediate vision. For example, if you have a tall patient, they will be able to hold whatever they need to read a little further away, ensuring success with this lens type.

Also, patients’ perspective on possibly having to undergo a lens exchange should be considered. Those patients who are risk-averse are good candidates for an extended depth of focus lens.

Make sure to clarify to patients that they will still need reading glasses with monofocal-plus lenses, especially for long-time reading, for small print or very detailed work. Also, it’s important to explain that in rare, very dim conditions, such as a candlelight dinner, they will have trouble reading.

We find that patients who would likely be a good fit for the monofocal-plus lens include those who are set on good quality of vision that’s not waxy like they might get from multifocal lenses. They also don’t want to contend with nighttime aberrations

like glare and halos that might affect them with trifocal lenses or even some other extended depth of focus IOLs. This may be particularly important to those who need to drive at night.

Other patients who tend to do well here are those who value good contrast under mesopic lighting conditions for hobbies such as photography or hunting and others who may be demanding high-quality vision.

Other Perspectives

While we may view the monofocal-plus lens as the new standard cataract IOL, we understand that not everyone concurs. Some argue that there is evidence that a monofocal lens offers the same defocus curve as a monofocal-plus. Also, while monofocal-plus lenses may be used for patients with glaucoma, AMD and other chronic eye conditions, the monofocal lens is considered as more forgiving in terms of irregular corneas or imperfect ocular surfaces. Further, not all monofocal IOLs are the same. There are differences between the various monofocal and enhanced monofocal IOLs on the market. However, if a company has both an enhanced and a standard version available the enhanced monofocal IOL may be preferable because of the mentioned benefits.

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Myth #2: I'm a Cataract Surgeon. I'm NOT a Refractive Surgeon.

BY ARTHUR CUMMINGS, MD, FWCRS. DUBLIN, IRELAND

Are you a cataract or a refractive surgeon? For some cataract surgeons this may not be at all that clear. But when attendees at the ESCRS conference were polled on this, 82 percent said they identified as refractive surgeons.

Deciding where one fits starts with looking at the essence of what it means to be a refractive surgeon and what the goals of refractive surgery should be (Figure 4). A refractive surgeon is someone who specializes in surgeries to correct refractive errors, including myopia, hyperopia, astigmatism and presbyopia. As their main goal, a refractive surgeon has their eyes on reducing or eliminating a patient's dependence on glasses or contact lenses, boosting the patient's overall vision and as a result also improving the patient's quality of life and daily activities.

What is the goal of surgery?

- ❖ Improve patient's overall vision
- ❖ Improve patient's quality of life and daily activities
- ❖ Reduce/eliminate patient's dependence on glasses or contact lenses

FIGURE 4: Understanding the main goals of refractive surgery to be the improvement of the patient's overall vision and quality of life.

Eyeing Emmetropia?

Aiming for patient visual correction will usually involve shooting for emmetropia but may look different depending on the type of lens you implant. With a trifocal lens, which offers a full range of focus, typically one aims for zero (refractive error) in both eyes to give the patient the best dysphotopsia profile and clarity of vision. This can help to minimize any unwanted visual aberrations that may arise with this type of lens.

With a monofocal or monofocal-plus lens, however, there's usually some amount of blended vision required. This means the patient has a slightly more myopic correction in one eye. While you may end up with a residual refractive error in the reading eye, the key thing is to try to maximize the quality of vision at all distances.

When you are taking a refractive approach, you want to get the best possible vision for your patient.

—Arthur Cummings, MD, FWCRS

Taking a refractive approach requires first deciding what kind of lens is best to accomplish a patients' goals and potentially reduce their reliance on spectacles while keeping dysphotopsia minimized. Other important factors to consider are surgeon technique and patient-related characteristics. Also with a refractive mindset, we're prioritizing maximizing visual quality at all distances and improving a patient's quality of life.

Essential Refractive Strategies

When determining your refractive strategy, it's important to take accurate measurements and assess the health of a patient's eyes. The typical preoperative measurements here are refraction assessment, corneal topography, pachymetry, wavefront analysis and pupil size and reaction. Considering these factors, as well as conducting a dilated eye exam and medical history, are essential before you are in a position to put a premium lens like a trifocal into an eye.

Importantly, the surface of the eye should also be taken into account. With these high-performance lenses it's crucial to assess the tear film with corneal staining and meibomian gland evaluation. Using these tests and scans is necessary to decide whether to implant an advanced technology lens. If there is dry eye disease present, the worry is it could cause visual fluctuations and interfere with accurate measurements and visual outcomes. Surprisingly, the 2022 ESCRS Clinical Trends Survey revealed that only 50% of respondents systematically check the ocular surface in all their preoperative cataract surgery examinations (Figure 5).^{1,2}

Are you systematically checking the ocular surface in your preoperative cataract surgery examination?

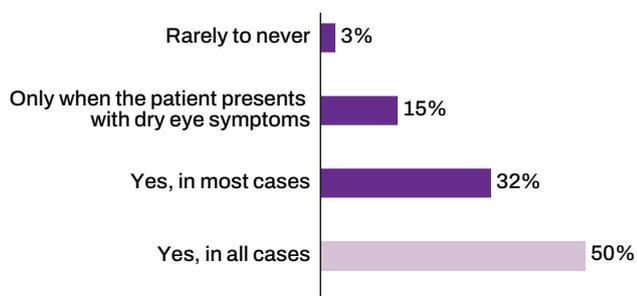


FIGURE 5: According to the 2022 ESCRS Clinical Trends Survey only 50% of respondents systematically check the ocular surface in all their preoperative cataract surgery examinations.

The aim of the refractive surgeon is to minimize any postoperative refractive errors. This begins by conducting a detailed evaluation and accurate biometry. We find that the informed consent process is a great time for making certain that the patient not only understands the pros and cons of the procedure but also ensures that they're ready for a less-than-perfect outcome and know the refractive strategy required to get them on target. This way it may not come as a surprise if they have a little dysphotopsia postoperatively, because they were told beforehand.

If an enhancement procedure is needed, this can vary from IOL exchange to customized wavefront or topography-guided treatments with a laser. In some cases, this can be handled

conservatively, by managing refractive error with eye drops and contact lenses. But for this to work successfully it takes careful follow up. You need to continuously look after the patient while they're neuro-adapting and getting used to the implanted lenses.

Anyone implementing these kinds of strategies is taking a refractive approach. If you're removing cataracts in a public hospital setting but take a refractive approach, you're still a refractive surgeon.

There are quite a few things that can be implemented in a practice if one thinks like a refractive surgeon, no matter the location. This may mean prioritizing patient safety, ensuring efficient triage and patient flow to enhance the patient experience and talking to patients about preventative care, especially in terms of improving the ocular surface, so that ultimately best outcomes can be achieved with a premium IOL. It also means practicing evidence-based medicine and making data-driven decisions.

The Importance of Thinking Refractively

A surgeon's mindset can have a clinical impact. If one limits their thinking too much, it may not only impact the patients but also possibly the practice in a negative way.

In fact, failing to offer patients refractive lens options can even lead to serious legal consequences, with some cataract surgeons facing lawsuits because they failed to discuss presbyopia-correcting IOL options or a toric correction with their patients.

Ultimately, a refractive surgeon's mindset and best practices on patient informed consent go hand in hand with achieving best visual outcomes and ensuring postop patient satisfaction. It all comes down to trying to get the best possible correction for the patient. That's exactly what refractive surgeons should aim for.

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FINANCIAL DISCLOSURES:

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Myth #3: Night Vision Dysphotopsia: Still a Common Concern with Presbyopia-Correcting IOLs?

BY RAMIN KHORAMNIA, MD, HEIDELBERG, GERMANY

When dealing with presbyopia IOL patients, concerns about dysphotopsia are paramount to many. Given that dysphotopsia is bothersome for patients causing dissatisfaction, it is important for practitioners to do what they can to keep this from occurring. Surgeons look for options to minimize the effects of this phenomenon, while still maximizing distance, as well as intermediate and near vision.

Dysphotopsia can be caused by clinical issues such as ocular surface disease, preexisting higher order aberration and posterior capsule opacification, as well as by residual refractive error and optical system alignment. Often, however, it is linked to lens design. 2022 ESCRS Clinical Trends Survey respondents estimated the average percentage of visual aberrations with modern presbyopia-correcting lens technologies to be 3.2% for enhanced monofocals, 4.0% for EDOF lenses and 4.9% in trifocal lenses (Figure 6).^{1,2}

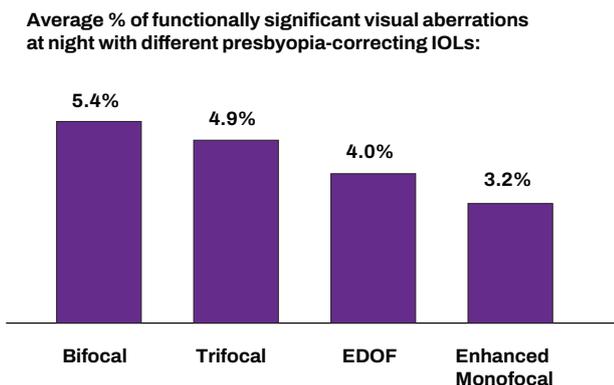


FIGURE 6: 2022 ESCRS Clinical Trends Survey respondents estimated the average nighttime visual aberrations with different presbyopia-correcting lenses.

Unfortunately, lenses that increase multifocality, also increase night vision symptoms that are considered bothersome by many patients. To minimize dysphotopsia you need a lens that reduces higher order aberration and maximizes visual quality (Figure 7).

Some lenses, like the extended range of vision IOLs, may still offer near vision with less chance of this occurring. These lenses use a non-diffractive design that stretches and shifts the wavefront, which means there's not really a different focal point, which can scatter light, but instead, a focal range.

Avoiding Night Vision Issues

The advantage of this design is that while photic phenomena at night can still occur, it is rarer. The extended range of vision lenses like the Vivivity ERV IOL (Alcon) can be much more forgiving at distance, may also offer more vision in the intermediate range and may even be able to achieve functional acuity at near.^{3,4}

Another approach used with the Tecnis Synergy IOL (Johnson & Johnson), melds this extended depth of focus

IOL design requires balance of 3 key points:

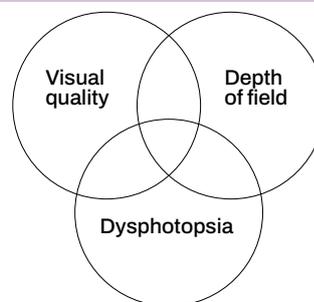


FIGURE 7: Understanding the balance between visual quality, depth of field and dysphotopsia in IOL design.

technology with diffractive multifocality. This lens relies on the echelette surface to diminish light scatter and halo intensity. It also comes with the achromatic technology, to correct chromatic aberration and optimize contrast vision. Also, a violet filter included here is designed to diminish nighttime dysphotopsia such as halo, glare and starburst.⁵⁻⁷

A different technology, the use of a small aperture lens, may work to extend the range of vision. This lens blocks para-central light, but allows the entry of paraxial light, creating an EDOF effect with excellent acuity at all distances. This may include a lens like the IC-8, (Bausch + Lomb) a type of IOL that functions particularly well in photopic conditions.^{8,9}

It's important to understand the patient's expectations beforehand.

—Ramin Khoramnia, MD

There's also a wavefront-shaping IOL where complex surface modulations of the central optical zone create spherical aberration of different orders, causing an increase in negative spherical aberration. This lens design, used by the LuxSmart Optic, (Bausch + Lomb) can also provide continuous distance and intermediate vision, and at the same time, can decrease the occurrence of photic phenomena.¹⁰

Matching Lenses with Patients

With so many options available, it then becomes a question of finding the right lens for the patients' needs. A cataract patient will have different expectations than a refractive lens exchange patient. Hence, it's important to understand the patient's expectations beforehand.

Since cataract patients often have very poor vision before surgery, their expectations on visual quality are frequently exceeded by premium lens technologies. Refractive lens ex-

change patients on the other hand, who have clear vision and are responsible for the cost of a premium lens and the surgery, often want more.

Regardless, it's also important to look at a patient's hobbies and profession and avoid choosing a lens that may get in the way of these activities. Then there's the patient's personality, and how they may respond to dysphotopsia.

The monofocal-plus lens technology provides excellent vision at distance and reasonably good results also in the intermediate range. However, even after surgery patients will require reading glasses with this lens option. Overall, costs here are low and driving at night is not an issue.

The extended depth of focus lenses are good for patients with an active lifestyle who demand high quality of vision and who frequently drive and work in the intermediate distance like e.g. computer work, but do not mind to wear reading glasses.

Trifocal lenses should be considered for anyone who wants a full range of vision and is intent on being free of spectacles. These are active people who only drive occasionally and who frequently engage in reading.

It is usually with these trifocal lenses that dysphotopsia becomes an issue. But even there, it is a question of managing expectations. As long as prior to surgery the patient is made aware of real possibility of dysphotopsia, they will likely be very happy after surgery with the full spectacle independence that they can achieve.

Should a patient have night dysphotopsia complaints, it is likely that they were not counseled in an appropriate way. They need to know that dysphotopsia comes from the lens design that also allows for their achieved spectacle independence.

However, if properly counseled patients usually have few complaints. Patients may even come back saying that the dysphotopsia they experience is actually much less than expected.

Anything practitioners can do to minimize dysphotopsia is ultimately a win for everyone. We are lucky to have such a wide array of options available today.

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Myth #4: Doctors Shouldn't be "Selling" Elective RIOL Technology to Patients

BY FRANCESCO CARONES, MD, MILAN, ITALY

Ophthalmologists today must grapple with the concept of whether or not they should or are in fact "selling" patients on the idea of refractive IOLs. When a question on this was put to attendees during the independent medical education (IME) forum on refractive IOLs at the 2023 ESCRS conference, opinions were divided.

Refractive IOLs are not something that patients are necessarily already informed about, as the 2022 ESCRS Clinical Trends Survey indicated (Figure 8). It revealed that 55% of patients are not very well educated, or they know nothing

about refractive IOL options. For cataract and refractive surgeons this means it is their responsibility to communicate the available lens options to their patients.^{1,2}

We need to distinguish between patient education and "selling" elective lenses. When discussing refractive IOL options it is important to know your patients, since we're well aware that IOLs are not all the same. We can pull from a growing armamentarium to best fit our patients' needs. This includes lenses such as monofocal IOLs, enhanced monofocal IOLs, extended depth of focus lenses and full range of focus lenses.

How educated are your patients on Refractive IOL options when they see you in person at their initial consultation?

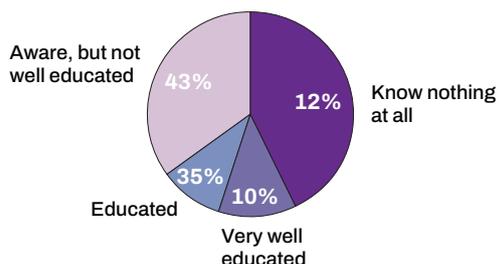


FIGURE 8: According to the 2022 ESCRS Clinical Trends Survey 55% of patients are not well educated or know nothing at all about available refractive IOL options.

Refractive patients themselves are all different and bring with them many variables involving age, amounts of presbyopia, preexisting refractive error, lifestyle and expectations. So, there are a host of variables to explore and to then communicate in the best way to our patients.

How these variables are communicated may impact how patients perceive the value of a refractive lens. There's a simple financial formula that offers perspective. It describes value as the ratio between cost and benefit. Benefits are all the advantages that the patient may perceive, like gaining range of focus and quality of life from not using spectacles (Figure 9).

Meanwhile, costs are not necessarily monetary. These may include other drawbacks associated like quality of vision related issues, as well as things such as a residual need to wear spectacles if the lens selected wasn't what the patient intended or doesn't suffice for some reason.

Another formula related to IOLs that can help here to manage expectations with these presbyopia-correcting lenses is to consider the value of spectacle independence and divide this by price and all the associated compromises, like residual spectacle dependence and quality of vision related issues (Figure 9).

$$\text{Value} = \frac{\text{Benefits}}{\text{Costs}}$$

$$\text{Value} = \frac{\text{Spectacle independence}}{\text{Price} + \text{Compromise}}$$

Benefits

- Range of focus
- Gain in quality of life provided by spectacle independence

Compromises

- Quality of vision related issues
- Residual spectacle dependence

FIGURE 9: Utilizing a cost benefit analysis when managing expectations with presbyopia-correcting IOLs.

Ensuring Informed Consent

There's also the issue of informed consent, which has potential legal ramifications. Our patients must know what's going on with their eyes and what lens we intend to implant. When they give their consent, it's because we explain to them, at least in our plan, the best choice we perceive for them. The idea is to give them a clear understanding of both the lenses themselves and the procedure used to implant these.

So, as part of the process, before they agree to the procedure, patients need to be told about the potential benefits of

having a premium lens implanted, as well as risks and any alternatives. They also need to know about the lens itself, its potential benefits and any possible disadvantages.

Prioritizing Patient Satisfaction

To maximize patient satisfaction, there are four critical phases. It begins with the preparatory phase where we gather information on the eye of the patient that we are going to implant the lens in. For the surgeon it means understanding your patients so that we can meet their expectations with the right lens choice and make them happy. For the patient this means understanding all the features of the IOLs that will be implanted, as well as all of their advantages and disadvantages.

Our patients must know what's going on with their eyes and what lens we intend to implant.

—Francesco Carones, MD

So, ultimately, we shouldn't perceive that practitioners are "selling" patients on refractive IOLs. Rather it is important to both educate and counsel the patient. Refractive lenses can offer a significant lifestyle improvement and patients need to know about all the options available to them.

Worst Case Scenario

Still, despite best efforts, anyone can have an unhappy patient occasionally. It's important to have a strategy in place for this. Especially when considering diffractive optics, it means telling the patient that there's a possibility of problems and that the worst-case scenario will entail replacing the IOL with another one that's not going to be offering the same type of spectacle independence.

However, before explanting a lens it is important to rule out other reasons for dysphotopsia. If the patient for example missed the target refraction, a touch-up procedure such as laser surgery or supplementary IOL may resolve the issue, while keeping the IOL in place.

So, in the end, it's not really about selling patients on what refractive lenses can do but making sure they are well informed about their options at all stages.

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FINANCIAL DISCLOSURES:

Francesco Carones is a consultant and an advisor for Alcon, BVI, CSO, Hoya Surgical Optics, Johnson & Johnson Vision, Percept Corporation, Slack Inc, and WaveLight GMBH. He's a member of the Speaker's Bureau for Staar Surgical and Trukera Medical.

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